PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title:	STARCH NETWORKS AS ABSORBENTS OR SUPERABSORBENT MATERIALS AND THEIR PREPARATION BY EXTRUSION
Appl. No.:	10/550,748
Inventor:	Claude Thibodeau et al
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TC/A.U.:	1623
Examiner:	Schmidtmann, Bahar
Docket No.:	CP.0077.US00

DECLARATION UNDER 37 C.F.R. § 1. 132

I, Frederic Picard, do hereby declare as follows:

1. I am currently employed by Archer Daniels Midland Company (ADM), the present assignee of the above referenced patent application. Prior to employment by ADM, I was employed by Le Groupe Lysac, Inc, (Lysac) the former assignee of the above referenced patent application. My duties with Lysac, and with ADM include, and have always included, management of patent preparation and prosecution for matters developed by personnel working in the field of absorbent polysaccharides.

2. In that capacity with Lysac I worked closely with the inventors on the present application and other employees engaged in research on absorbent particles made from various types of starch and starch derivatives, and the use of extruders to make the same. I have institutional recollection of facts associated with that work and have access to archival notebooks, data, and memorandum prepared by Lysac personnel pertaining to the same.

3. I have read and understand the Office Action dated April 26, 2011 for the above referenced application and have read the cited art, including Grossmann et al (*Carbohydrate Polymers 45, 2000, 347-353)*. It is my understanding that the US Patent Office takes the position that extruded starch particles from cassava, such as those taught by Grossmann, including those cross linked with sodium trimetaphosphate (STMP) would inherently have FSC and CRC values of at least 13 g/g and a and at least 10 g/g for a solution of solution of 0.9% saline. This is not the case.

4. The term "waxy starch" has a defined meaning in the field of starch research and plant breeding and refers to a starch that is almost entirely amylopectin, certainly always greater than 90% amylopectin. (See *Functional Properties of Starch*, M. Satin, *FAO Agricultrual and Food Engineering Service*, Table 2, attached herewith). Waxy varieties of starch bearing plants are not

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naturally occurring but rather are generated by plant breeding and genetic engineering techniques. Hence, in the scientific literature, an author working with a waxy starch variety will always refer to it specifically as "waxy". A reference to a starch without the prefix "waxy" means the starch is ordinary starch. Grossmann does not refer to waxy cassava starch, but merely refers to cassava starch. The amylose content of ordinary cassava starch is 17% (see Satin, Table 2) the remaining 83% being amylopectin. Indeed, waxy cassava was almost assuredly not used in Grossmann, because the discovery (development) of waxy cassava appears to be much later than the year 2000 publication date of Grossmann. (See *Discovery of an Amylose-free Starch Mutant in Cassava*, by Ceballos et al, *J. Agric. Food Chem* 2007, 55 7459-7476, attached herewith).

5. Our group has not experimented with any cassava starch, however has done several extrusion and cross linking reactions with wheat starch. Wheat starch has an amylose content of 26% meaning an amylopectin content of 74%. The properties of extruded and crosslinked wheat starch will be far more similar to the properties of extruded and crosslinked cassava starch than waxy starch because of the presence of relatively similar amounts of amylose in cassava and wheat.

6. Attached herewith is an "Experimentation Sheet" derived from our data archives dated September 6, 2002. In that experiment, a wheat starch designated "Starch A," was subject to extrusion and simultaneous cross linking with a solution comprising 99% sodium trimetaphosphate (STMP) and 1% sodium tripolyphosphate (STPP). This is the nearest conditions from our work, to the extrusion and cross linking of cassava starch with STMP as taught by Grossmann. It will be observed from the Product Analysis results, that the extruded cross linked particles had an absorption (FSC) of only 5.6 g/g and a CRC of only 4 g/g. It is therefore evident that ordinary (non waxy) starches extruded with and crosslinked with STMP will not produce particles that have FSC and CRC values of at least 13 g/g and a and at least 10 g/g respectively.

7. In addition, it will be noted that the STMP crosslinking and extrusion conditions disclosed by Grossmann are such that the crosslinking reaction occurs first, followed by the reactive extrusion. In contrast, in the instant application and in the data from the Experimentation Sheet, where crosslinking is used, the crosslinking occurs during the extrusion process. Because starch is in the form of granules rather than an open molecular structure, the prior crosslinking reaction in Grossmann would only affect starch moieties on the outer side of the granule. In contrast, the crosslinking during extrusion opens up the granular structure to form an accessible network. Hence, the crosslinking and extrusion process described by Grossmann would result in a different cross-linking pattern and therefore even lower FSC and CRC values than those demonstrated by us illustrated in the Experimentation Sheet.

8. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that the making of willfully false statements and the like is punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and may jeopardize the validity of any patent issuing thereon. F.P.

September 27, 2011
Date

Frederic Picard